



University of Kerala

Discipline	<b>CHEMISTRY</b>				
Course Code	<b>UK3DSECHE205</b>				
Course Title	<b>FORENSIC CHEMISTRY I</b>				
Type of Course	<b>DSE</b>				
Semester	3				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	4 hours	-	-	4
Pre-requisites	1. Higher secondary level science knowledge				
Course Summary	The course covers topics including Criminology, Domains in Forensic Science, Forensic Laboratories at National and International levels and Forensic Institutions- their Role, Functions, Services, and Functionalities, Role of chemistry in forensic science.				

Detailed Syllabus:

Module	Unit	Content	Hrs
		FORENSIC CHEMISTRY I	
I		<b>INTRODUCTION TO FORENSIC SCIENCE- BASIC PRINCIPLES</b>	<b>9</b>
	1	Introduction, Definition, Significance and Scope of Forensic Science	1
	2	Principles & domains of Forensic Science: Forensic chemistry, Forensic Physics, Forensic biology & Forensic medicine	2
	3	Introduction to Forensic Photography, Ballistics, Fingerprint	1
	4	Introduction to Forensic Psychology, Forensic Anthropology, and	1
	5	Computer Forensics / Cyber Forensics: Definition, scope, and importance, Types of cybercrime: hacking, phishing, identity theft, cyberstalking	2
	6	Forensic toxicology: Definition, Classification of poisons: inorganic, organic, synthetic, and natural, Signs and symptoms of poisoning (cyanide, arsenic, alcohol, pesticides), Alcohol detection in blood and breath.	2
II		<b>CRIMINOLOGY</b>	<b>9</b>
	7	History and Development of Forensic chemistry in India: Pre & Post-Independence Developments	2



	8	Crime: Definition of crime, Characteristics & classification of crimes: White collar crime, professional crime, organized crime.	2
	9	Criminal: Definition of criminal, classification of Criminals based on nature of crime, motive, mental condition & sociological condition (elementary idea only)	3
	10	Criminology: Definition of criminology, classification of criminology based on area of study and application	2
<b>III</b>	<b>FORENSIC LABORATORIES AND FORENSIC INSTITUTIONS-ROLE, FUNCTIONS</b>		<b>9</b>
	11	Forensic laboratories in India (Centre and Kerala), services and functions of forensic science laboratories.	1
	12	Various institutions and their functioning- NFSU, NCRB, CDTS, CCMB, CDFT, NTRO	2
	13	Qualifications, Duties & Functions of Forensic Scientist	2
	14	Definition of ethics & Ethical issues in Forensic Science	2
	15	Forensic science in national international perspectives, and concept of INTERPOL and FBI.	2
<b>IV</b>	<b>ROLE OF CHEMISTRY IN FORENSIC SCIENCE</b>		<b>18</b>
	16	Introduction to forensic chemistry, advantages and disadvantages	3
	17	Role of chemistry in crime detection: Identification and Analysis of Substances, Detection of Trace Evidence, Chemical Analysis of Biological Samples, Chemical Reagents for Crime Scene Processing	5
	18	Basics: Concept of accuracy, precision and error	2
	19	Concentration terms: Molarity, Molality, normality, parts per million and interconversions	2
	20	pH of a solution, Theory of Acid -Base titrations, theory of acid base indicators	3
	21	Buffers: buffer action, buffers in biological and forensic system	3
<b>V</b>	<b>OPEN ENDED MODULE: Learning through problem solving, seminars, open discussions, assignment discussions, Quizzes, Open book exams etc</b>		<b>15</b>
		1. Assignments on role of chemistry in crime investigation 2. Visit to forensic Laboratories 3. Debates on present crime issues 4. Presentation on different forensic science laboratories	

### References

1. Richard Saferstein: *Criminalistics: An Introduction to Forensic Science*, Pearson Publishing,
2. Brent E. Turvey, *Criminal Profiling: An Introduction to a Behavioral Evidence Analysis*, Academic Press
3. Sharma, B.R; *Forensic Science in Criminal Investigation & Trials*, Universal Publishing Co., New Delhi, 2003
4. Nanda B.B and Tewari, R.K; *Forensic Science in India- A vision for the*



- Twenty First Century*, Select Publisher, New Delhi, 2001.
- Houck, M.M & Siegel, J.A; *Fundamentals of Forensic Science*, Academic Press, London, 2006.
  - Prof. N.V. Paranjape Criminology & Penology (including Victimology) Central Law Publications
  - James, S.H and Nordby, J.J; *Forensic Science- An Introduction to Scientific and Investigative Techniques*, CRC Press, USA, 2003.
  - Puri, Sharma & Kalia, *Principles of Inorganic chemistry*.

**Course Outcomes**

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
1	Demonstrate the basic principles of forensic science, principles and various domains.	An	5
2	Illustrate the basics of crime and types of crime, Criminology, Criminology in India.	An	3
3	Recognizes the importance and functions of forensic laboratories and Forensic Institutions.	E	3,5
4	Recognize the role of chemistry and its applications in Forensic Science	C	3
5	Demonstrate the role of forensic Science and chemistry in crime investigation	C	5

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E- Evaluate, C-Create**

**Name of the Course: FORENSIC CHEMISTRY I**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)
1	CO-1	PSO-1,3,5 PO-1,2,3	An	C	L	
2	CO-2	PSO-1,3,5 PO-1,2,3	An	F, C	L	
3	CO-3	PSO-1,3,5 PO-1,2,3	E	F, C, P	L	
4	CO-4	PSO-1,3,5 PO-1,2,3,8	C	F, C, P	L/T	
5	CO-5	PSO-1,3,5	C	F, C, P, M	T	



		PO-1,2,3,4				
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F-Factual, C- Conceptual, P-Procedural, M- Metacognitive

Mapping of COs with PSOs and POs:

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO 1	3	-	2	-	2	2	2	2	-	-	-	-	-
CO 2	2	-	2	-	3	2	3	1	-	-	-	-	-
CO 3	1	-	2	-	2	1	2	2	-	-	-	-	-
CO 4	2	-	1	-	1	2	1	3	-	-	-	-	3
CO 5	2	-	2	-	2	3	2	1	3	-	-	-	

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics:

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓			✓
CO 4		✓		✓
CO 5		✓	✓	

